



# A CROSS SECTIONAL SURVEY ON AWARENESS ABOUT STROKE AMONG STROKE PATIENTS AND THEIR BYSTANDERS FROM A TERTIARY CARE CENTRE, KERALA

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## ABSTRACT

**Background:** Stroke is the leading cause of death and functional impairment accounting a major burden of global non-communicable diseases (1, 2). The knowledge about stroke, risk factors and warning signs among the patients and bystanders is an unexplored area (1). The aim of this study was to assess the knowledge of stroke risk factors and warning signs among patients and bystanders. **Materials and methods:** Patients diagnosed with current and recurrent stroke of age > 18 years were recruited from in-patient units of stroke medicine department at Amrita institute of medical science and research centre from October 2020 to April 2021. Those patients with sufficient communicative ability were included in the survey and those with severe aphasia, limiting the comprehension were excluded from the survey. A structured closed-ended study questionnaire was used to collect the data regarding the baseline characteristics and to assess the knowledge on stroke among the participants (patients and bystanders). Participants were interviewed to answer questions regarding the demographic characteristics, risk factors, awareness about stroke and its warning signs by the research personal. The data were analysed using SPSS version 21. **Results:** A total of 91 patients participated in the survey. The mean age of the study population was 60.73 (13.38) years. The proportion of males was 61.5%. Patients from rural places (64.8%) was more compared to urban (34.1%). Majority of the patients (85.7%) could not identify that they have been hit with stroke. The most commonly recognized risk factors were hypertension (78%), diabetes (47.3%), dyslipidemia (38.5%) followed by cardiovascular diseases (33.3%). Regarding stroke warning signs, the most commonly recognized warning signs were upper and lower limb weakness (34.1%), both upper and lower limb weakness with deviation of mouth (17.6%), both upper and lower limb weakness, deviation of mouth and slurring of speech (7.7%). Only 12.1% bystanders were aware about the signs of stroke. **Conclusion:** The results from the current survey showed that the general awareness of stroke is still unsatisfactory among stroke patients and bystanders. The healthcare provider should provide structured interventions to increase awareness and knowledge about stroke in the public.

**KEYWORDS:** Stroke awareness, Risk factors of stroke, Stroke and awareness, Patients and by standers awareness about stroke, stroke symptoms and risk factors, stroke knowledge.

## INTRODUCTION:

Stroke is the leading cause of death and functional impairment accounting to a major burden of global non-communicable diseases (1, 2). The prevalence of stroke in India varies in different regions of the country and ranges from 40-270 per 100000 population (3-4) it has been found that around 12% of people affected with stroke come under the age group above 40yrs (3). Considering the present scenario in India where the population is surviving beyond the peak years (55-65yrs) for the risk of stroke, the socioeconomic burden to meet the costs of rehabilitation of stroke victims is enormous (5). The implementation of specialised stroke units and thrombolytic therapy have led to significant improvement of acute stroke treatment (6,7). In spite of these advances in stroke therapy, the public remains uninformed about strokes, and only few stroke patients seek hospital care in terms of arriving at time to receive treatment. Multilevel intervention and coordination is required to influence the behaviour and knowledge of the public to influence the efficient use of thrombolytic therapy within the right time window (6,7).

The timely implementation and success of stroke management greatly depends on the public knowledge about stroke, particularly individuals at high risk and their caregivers which necessitates the importance of improving public knowledge about stroke (8).

The aim of this study was to assess the knowledge of stroke risk factors and warning signs among patients and bystanders.

## MATERIALS AND METHODS:

Patients diagnosed with current and recurrent stroke of age > 18 years were recruited from in-patient units of stroke medicine department at Amrita institute of medical science and research centre from October 2020 to April 2021. Those patients with sufficient communicative ability were included in the survey and those with severe aphasia, limiting the comprehension were excluded from the survey. A structured closed-ended study questionnaire was used to collect the data regarding the baseline characteristics and to assess the knowledge on stroke among the participants (patients and bystanders). Participants were interviewed to answer questions regarding the demographic characteristics, risk factors, awareness about stroke and its warning signs by the research personal. The data

were analysed using SPSS version 21.

## RESULTS:

A total of 91 patients participated in the survey. The participant's demographic details and baseline characteristics: gender, place of residence, occupation, type of stroke, education, occurrence of stroke and risk factors are presented in Table 1. The level of awareness about stroke among patients/bystanders, actions taken, symptoms and various measures adopted are illustrated in Table 2.

The mean age of the study population was 60.73 (13.38) years. The proportion of males was 61.5%. Patients from rural places (64.8%) were more compared to urban (34.1%). Majority of the patients (85.7%) could not identify that they have been hit with stroke.

The most commonly recognized risk factors were hypertension (78%), diabetes (47.3%), dyslipidemia (38.5%) followed by cardiovascular diseases (33.3%).

Regarding stroke warning signs, the most commonly recognized warning signs were upper and lower limb weakness (34.1%), both upper and lower limb weakness with deviation of mouth (17.6%), both upper and lower limb weakness with deviation of mouth (17.6%), both upper and lower limb weakness, deviation of mouth and slurring of speech (7.7%). Only 12.1% bystanders were aware about the signs of stroke.

**Table 1: Baseline characteristics of study population**

Variables	Frequency	Percentage (%)
Sex		
Male	56	61.5
Female	35	38.5
Place of residence		
Urban	31	34.1
Rural	59	64.8

Type of stroke		
Ischemic	69	75.8
Haemorrhagic	22	24.2
Occupation		
Professional	46	50.6
Skilled	34	37.4
Unskilled	11	12.1
Education		
Low	10	11
Medium	65	71.5
High	16	17.6
Occurrence of stroke		
First stroke	74	81.3
Recurrent stroke	17	18.7
Risk factors		
Hypertension	71	78
Diabetic mellitus	43	47.3
Dyslipidemia	35	38.5
CVD	30	33.3

Table 2: Awareness about stroke among patients/bystanders

Variables	Frequency	Percentage (%)
Patient's questions		
Aware about stroke warning signs		
Aware	13	14.3
Unaware	78	85.7
Symptoms		
Upper and lower limb weakness	31	34.1
Upper and lower limb weakness and deviation of mouth	16	17.6
Who identified stroke		
Family	88	96.7
Self	3	3.3
Action taken		
Rushed to hospital	84	92.3
Stayed home	7	7.7
Conscious when reached hospital		
Yes	67	73.6
No	24	26.4
No. of hospitals visited		
1	61	67
More than 1	30	33
Bystander's questions		
Have you helped anyone to reach hospital		
Yes	13	14.3
No	78	85.7
Aware that stroke is a dangerous condition		
Yes	45	49.5
No	46	50.5
Are you able to identify that patient is getting hit by stroke		
Yes	12	13.2
No	79	86.8
Did you know signs of stroke		
Yes	11	12.1
No	80	87.9
Aware of any emergency number to call when you see someone in danger		
Yes	14	15.4
No	77	84.6

**DISCUSSION:**

Stroke is the major cause of disability in the world and its incidence has increased during the past four decades (9). The main factors that contribute to high mortality and morbidity in stroke is delay in hospitalization (10). Various population studies conducted over the years shows suboptimal awareness on the risk factors of stroke and warning signs associated with stroke onset. (13,14,15,16,17,18).

The present study was done to assess the knowledge of stroke risk factors and warning signs among stroke patients and bystanders in South India. This study was conducted among the stroke patients and their bystanders admitted to the hospital and supposed to get increased accuracy of responses. This was mainly because, the subject who seeks medical care would be more aware about the problem rather than someone who is completely unaware. This is a hospital-based cross sectional survey. It is noticeable that even in patients and family with good educational and occupational status the awareness percentage was not appreciable. It implies that irrespective of these backgrounds we have to go ahead with aggressive public awareness campaigns starting from primary care physicians to all levels of stroke care.

The present study was a hospital based study which indicates the importance of improving the level of public knowledge of stroke risk factors and warning signs. The mean age of the study population was 60.73 (13.38) and proportion of males was 61.5%. Similarly in a systematic review mean age for men was 68.6 years, and 72.9 years for women and male stroke incidence rate was 33% higher and stroke prevalence was 41% higher than the female (28).

In our study, 85.7% of the respondents were not aware of any established stroke warning signs. In a hospital-based study in Northwest India, majority (73%) of respondents did not realize that the symptoms were due to stroke (21).

In this study the most frequently identified risk factor were high blood pressure (78%). Population-based studies in South Korea (22) and Hong Kong (23) also reported that high blood pressure was the most frequently identified risk factor of stroke. The other risk factors observed in our study were diabetes (47.3%), dyslipidemia (38.5%) and CVD (33.3%). These results suggest that community-based stroke prevention strategies should focus on the established stroke risk factors. Increasing public awareness of stroke prevention and warning signs and symptoms is desirable, particularly in the at-risk population.

Upper and lower limb weakness (34.1%) was the most common stroke warning sign listed by respondents. A lower proportion of respondents listed weakness and paralysis of one side of body as stroke warning sign. This result is similar in a study of patients with acute stroke, Kothari et al reported that the most commonly documented stroke warning sign was "weakness of limb" (11). In a population-based telephone interview survey, Pancioli et al reported that the most common stroke warning signs listed by respondents were dizziness and numbness (13). A community-based telephone interview survey the most common warning sign of stroke described by respondents was "blurred and double vision or loss of vision in an eye" (19). This finding suggests that a community education program should include teaching the warning signs of stroke as well as the appropriate responses. In this study patients from rural places (64.8%) were more compared to urban (34.1%). Similarly in a survey-based study, the rural population had more prevalence rate of stroke where as urban population (12%) was unaware of the warning signs of the stroke (27).

We found a negative relationship between stroke knowledge and higher education. Majority (59%) of our patients were from rural area but in India educational opportunities are more in the urban than in the rural areas. However, Kothari et al did not find any correlation between better awareness and education (11). Most studies on awareness of stroke from developed countries have found that knowledge of stroke varies with education (21,24). It has been found that even the people who are aware that they have risk factors for stroke, have poor knowledge about the stroke warning signs similar to those without risk factors (20).

Majority of the respondents (92.3%) took the patient to the hospital when they experienced symptoms of stroke. Similar responses were seen in other studies (25,26). But in a Korean study only 46% of them mentioned that they would visit a hospital (22).

This study indicates that there is lack of awareness among the patients and bystanders about stroke warning symptoms and risk factors. We found that awareness of stroke warning signs and risk factors was low in both the stroke patients and bystanders. The study population's lack of knowledge about the warning signs of stroke, stroke risk factors and the delay in hospitalization have been highlighted in this study. Widespread awareness about stroke symptoms and the importance of receiving early medical attention within the first few hours after stroke onset is very necessary to minimise the disability due to stroke and maximise the quality of life (11,12).

**CONCLUSION:**

The results from the current survey showed that the general awareness of stroke is very minimal among stroke patients and family members. This points the urgent need for enhanced public awareness efforts to improve the treatment and outcome of stroke patients. The healthcare provider starting from the primary

care physicians should provide structured interventions to increase awareness and knowledge about stroke in public. Implementation of awareness programs is imperative in order to improve the awareness and management of stroke.

Appelros, MD, PhD; Birgitta Stegmayr, PhD; Andreas Tere 'nt, MD, PhD

## REFERENCES:

- I. Pathitta Suangpho and Somsak Tiamkao, Knowledge of Stroke Risk Factors and Warning Signs in Patients with Recurrent Stroke or Recurrent Transient Ischaemic Attack in Thailand, *Neurology Research International* / 2017.
- II. Anne Hickey, Ann O'Hanlon, Hannah McGee, Claire Donnellan, Emer Shelley, Frances Horgan & Desmond O'Neill, Stroke awareness in the general population: knowledge of stroke risk factors and warning signs in older adults, *BMC Geriatrics* 2017
- III. Anand K, Chowdhury D, Singh KB, Pandav CS, Kapoor SK. Estimation
- IV. of mortality and morbidity due to strokes in India. *Neuroepidemiology*. 2001;20:208–211.
- V. Razdan S, Koul RL, Motta A, Kaul S. Cerebrovascular disease in rural Kashmir, India. *Stroke*. 1989;20:1691–1693.
- VI. Dalal PM. Stroke in India: issues in primary and secondary prevention. *Neurol India*. 2002;50:S2–S7.
- VII. Hickey A, O'Hanlon A, McGee H, Donnellan C, Shelley E, Horgan F, O'Neill D. Stroke awareness in the general population: Knowledge of stroke risk factors and warning signs in older adults. *BMC Geriatr* 2009; 9:1-8
- VIII. 7. Morgenstern LB, Bartholomew LK, Grotta JC, Staub L, King M, Chan W. Sustained benefit of a community and professional intervention to increase acute stroke therapy. *Arch Intern Med* 2003; 163(18):2198-202.
- IX. 8. Blades LL, Oser CS, Dietrich DW, Okon NJ, Rodriguez DV, Burnett AM, et al. Rural community knowledge of stroke warning signs and risk factors. *Prev Chronic Dis*. 2005;
- X. 9. Johnson W, Onuma O, Owolabi M, et al. (2016) Stroke: a global response is needed. *Bull World Health Organ* 94: 634–634A.
- XI. 10. Srivastava AK, Prasad K (2001) A study of factors delaying hospital arrival of patients with acute stroke. *Neurol India* 49: 272–276.
- XII. 11. Kothari R, Sauerbeck L, Jauch E, Broderick J, Brott T, Khoury J, Liu T: Patients' awareness of stroke signs, symptoms, and risk factors. *Stroke* 1997;28:1871–1875.
- XIII. 12. Rausch M, Turkoski B: Developing realistic treatment standards in today's economic climate: Stroke survivor education. *J Adv Nurs* 1999;30:329–334.
- XIV. 13. Pancioli AM, Broderick J, Kothari R, Brott T, Tuchfarber A, Miller R, Khoury J, Jauch E: Public perception of stroke warning signs and knowledge of potential risk factors. *JAMA*. 1998, 279: 1288-1292. 10.1001/jama.279.16.1288.
- XV. 14. Reeves MJ, Hogan JG, Rafferty AP: Knowledge of stroke risk factors and warning signs among Michigan adults. *Neurology*. 2002, 59: 1547-1552.
- XVI. 15. Schneider AT, Pancioli AP, Khoury JC, Rademacher E, Tuchfarber A, Miller R, Woo D, Kissela B, Broderick JP: Trends in community knowledge of the warning signs and risk factors for stroke. *JAMA*. 2003, 289: 343-6. 10.1001/jama.289.3.343.
- XVII. 16. Reeves MJ, Rafferty AP, Aranha AAR, Theisen V: Changes in knowledge of stroke risk factors and warning signs among Michigan adults. *Cerebrovasc Dis*. 2008, 25: 385-391. 10.1159/000121338.
- XVIII. 17. Fang J, Keenan NL, Ayala C, Dai S, Merritt R: Awareness of stroke warning symptoms – 13 states and the district of Columbia, 2005. *JAMA*. 2008, 300: 274-276. 10.1001/jama.300.3.274.
- XIX. 18. Silver FL, Rubini F, Black D, Hodgson CS: Advertising strategies to increase public knowledge of the warning signs of stroke. *Stroke*. 2003, 34: 1965-1969. 10.1161/01.STR.0000083175.01126.62.
- XX. 19. Yoon SS, Heller RF, Levi C, Wiggers J, Fitzgerald PE: Knowledge of stroke risk factors, warning symptoms, and treatment among an Australian urban population. *Stroke*. 2001, 32: 1926-1930.
- XXI. 20. Asdrubal Falavigna I, Alisson Roberto Teles II, Viviane Maria Vedana II, Awareness of stroke risk factors and warning signs in southern Brazil, *Arq. Neuro-Psiquiatr*. vol. 67 no. 4 São Paulo Dec. 2009
- XXII. 21. Jeyaraj Durai Pandian I, Guneet Kalra I, Ashish Jaison I, Knowledge of stroke among stroke patients and their relatives in Northwest India, *neurology of india*.
- XXIII. 22. Kim JS, Yoon SS. Perspectives of stroke in persons living in Seoul, South Korea: a survey of 1000 subjects. *Stroke*. 1997;28:1165–1169.
- XXIV. 23. Cheung RTF, Li LSW, Mak W, Tsang KL, Lau LJ, Chan KH, Fong CY. Knowledge of stroke in Hong Kong Chinese. *Cerebrovasc Dis*. 1999;9:119–123.
- XXV. 24. Stroke awareness program: The necessary facts for a successful campaign [2]
- XXVI. Pati, S. and Nambron, R. *Neurology India*. 2006; 54(4): 444 [PubMed]
- XXVII. 25. Reeves MJ, Hogan JG, Rafferty AP. Knowledge of stroke risk factors and warning signs among Michigan adults. *Neurology*. 2002; 59: 1547–1552. Crossref Medline Google Scholar
- XXVIII. 26. Parahoo K, Thompson K, Cooper M, Stringer M, Ennis E, McCollam P. Stroke: awareness of the signs, symptoms and risk factors: a population-based survey. *Cerebrovasc Dis*. 2003; 16: 134–140. Crossref Medline Google Scholar
- XXIX. 27. Pirjade Ambarin MRushika G. Telhande G. Telhande Yadav Trupti awareness of early warning signs of stroke in rural and urban population September 2021 *Journal Human Research in Rehabilitation* 11(2):159-162
- XXX. 28. Sex Differences in Stroke Epidemiology A Systematic Review Peter